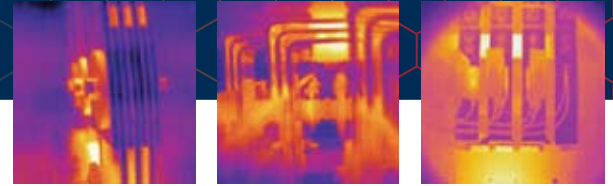


IR Windows and PPE – Relevant Outtakes from NFPA 70E, 2009

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The purpose of this summary is to answer a common question regarding whether PPE is required while using infrared (IR) windows. For a full understanding on this topic, readers are encouraged to download a white paper entitled *NFPA and its Implications on Thermographic Inspections* (www.iriss.com)

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Editorial Note: The quoted portions of NFPA 70E are *italicized* and indented. Any underlining within the quoted passages was added for editorial emphasis.

NFPA 70E is a very useful document for tasks where workers are exposed to electrical hazards. However, use of an infrared window is a non-intrusive task which maintains a separation between worker and the energized components inside the enclosure. In this regard, use of an infrared window or "sightglass" is no more and no less than the hazard/risk of using a panel meter, using a visual inspection pane, or walking past energized equipment that is enclosed and "safe" (that is equipment which is properly installed, properly maintained, and properly operated). As such, use of infrared windows does not fall under the umbrella of 70E which is intended for risk-increasing or intrusive tasks.

Assuming that IR windows maintain an IP65 / NEMA 4 seal, are properly installed using manufacturer's instructions follow industry-standard procedures, and assuming that the equipment in question is "safe" (as detailed above), then the process of using an infrared window maintains an "enclosed" and "guarded" condition.

Article 100 – Definition of "Enclosed:"

Surrounded by a case or housing, fence or the wall(s) that prevents persons from accidentally contacting energized electrical conductors and circuit parts. (70, 2008)

Article 100 – Definition of "Guarded:"

Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats, or platforms to remove the likelihood of approach or contact by persons or objects to a point of danger. (70, 2008)

When equipment is in an "enclosed" and "guarded" condition, the likelihood of a spontaneous arc flash is minimal unless the equipment has been improperly installed, improperly maintained or is being used in an improper manner, or if the operator is using the equipment in a manner that the Hazard/Risk Tables identify as high-risk such as racking and un-racking breakers.

Article 100 – Definition of "Arc Flash Hazard"; FPN No. 1:

An arc flash hazard may exist when energized electrical conductors or circuit parts are enclosed or when they are within the equipment in a guarded or enclosed condition, provided a person is interacting with the equipment in such a manner that could cause an electrical arc. Under normal operating conditions, enclosed energized equipment that has been properly installed and maintained is not likely to pose an arc flash.

Article 100 – Definition of "Arc Flash Hazard"; FPN No. 2:

See Table 130.7 (C)(9) for examples of activities that could pose an arc flash hazard.

The now famous Table 130(C)(9) should be consulted when risk of exposure to electrocution or arc flash is present. As noted in the Article 100 Definitions, such risks are minimized when equipment remains in an enclosed and guarded condition. Evidence of this logic exists in the Table itself which primarily lists tasks performed when personnel are directly exposed to energized conductors and circuit parts in an open and un-guarded condition. The Table also includes tasks which dramatically increase the risk levels due to the invasive nature of the task such as racking and un-racking breakers, which constitutes a task which is "interacting with the equipment in such a manner that could cause an electrical arc." (Article 100 Definition of Arc Flash Hazard, FPN No. 1)

110.1 Scope:

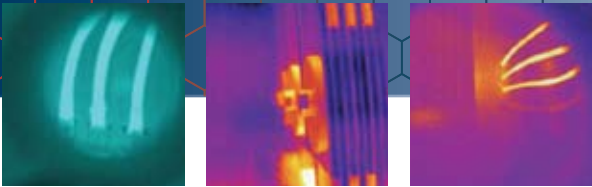
Chapter 1 covers electrical safety-related work practices and procedures for employees who are exposed to an electrical hazard in the workplaces covered in the scope of this standard....

130.7 (A) General:

Employees working in areas where electrical hazards are present shall be provided with, and shall use, protective equipment that is designed and constructed for the specific part of the body to be protected and for the work to be performed.

130.7 (C) General:

When an employee is working within the Arc Flash Protection Boundary he or she shall wear protective clothing and other personal protective equipment...



Workers should also consult the PPE requirements of 70E in instances when the purpose of the infrared inspection is to troubleshoot equipment which is suspected or known to have developed a dangerous fault, or when inspecting equipment where sudden changes could occur without warning to the worker. In such cases, full PPE should be utilized as if the worker was fully exposed to energized components, since there is an added level of hazard/risk inherent in such cases.

130.7(C)(9) Selection of (PPE) When Required for Various Tasks; FPN No. 2 ...in most cases closed doors do not provide enough protection to eliminate the need for PPE for instances where the state of the equipment is known to readily change (eg., doors open or closed, rack in or rack out)."

Activities which do not raise the risk of arc flash and do not expose the worker to energized electrical components and circuit parts, such as "reading a panel meter while operating a meter switch" (a task listed in Table 130.7(C)(9)) do not raise the risk of arc flash, are non-intrusive and do not expose the worker to energized conductors and circuit parts. Use of an infrared window or visual viewing pane fall into this category. Therefore, such activities do not require the use of elevated levels of PPE above and beyond what is typically required in the area where the enclosed, energized equipment is located, and are not relevant to the 70E standards where PPE is prescribed.

For additional information on the subject, download the free white paper entitled, *NFPA and its Implications on Thermographic Inspections*, as found in the White Papers & Tech Notes section of www.iriss.com.